

REMARKS

Reconsideration and allowance of this application are respectfully requested. Currently, claims 1-17 and 20-53 are pending in this application.

Rejections under 35 U.S.C. §102 and 103:

Claims 1-6, 17, 20-25, 36-40 and 51-53 were rejected under 35 U.S.C. §102 as allegedly being anticipated by Hu et al (U.S. '538, hereinafter "Hu"). Applicant traverses this rejection.

Anticipation under Section 102 of the Patent Act requires that a prior art reference disclose every claim element of the claimed invention. See, e.g., *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1574 (Fed. Cir. 1986). Hu fails to disclose every claim element of the claimed invention. For example, Hu fails to disclose "matching, by execution of a computer system, sub-field/frame elements of a test video field/frame with corresponding sub-field/frame elements of at least one reference video field/frame, and thereby generating for the test video field/frame a matched reference field/frame comprising the sub-field/frame elements of the at least one reference video field/frame which match to the sub-field/frame elements of the test video field/frame; [and] positioning, by execution of the computer system, in the matched reference video fields/frame at least one of the matching sub-field/frame elements to compensate for misalignment between at least one of the sub-field/frame elements of the test video field/frame and the at least one matching sub-field/frame elements," as required by independent claims 1 and its dependents. Hu also fails to disclose "matching sub-field/frame elements of a test video field/frame with corresponding sub-field/frame elements of at least one reference video field/frame, and thereby generating for the test video field/frame a matched reference field/frame comprising the sub-field/frame elements of the at least one reference video field/frame which match to the sub-field/frame elements of the test video field/frame; [and]

shifting, by execution of the computer system, relative to the matched reference field/frame at least one of the matching sub-field/frame elements to compensate for misalignment between at least one of the sub-field/frame elements of the test video field/frame and the at least one matching sub-field/frame elements,” as required by independent claim 17 and similarly required by independent claim 20, as well as their respective dependents.

Page 4 of the Office Action alleges the following:

It is noted the claimed “affecting a sub-field/frame element” can be interpreted as “affecting a sub-field **or frame element** (emphasis original).” It is noted that claims are not limited to only sub-field element but include frame element. Thus, Hu anticipates the claims because they include frame element.”

The above allegations of the Office Action are erroneous. As described in more detail below, the Office Action’s allegation that “affecting a sub-field/frame element” can be interpreted as “affecting a sub-field **or frame element**” is erroneous -- as this interpretation would be (A) completely inconsistent with the other explicit words of the claims and context thereof, and (B) completely inconsistent with the explicit teachings of the specification. With respect to (A), claim 1 requires, for example, “sub-field/frame elements of a test video field/frame” (emphasis added; note that “frame elements” is plural and note the other claim language “of a test video field/frame”) and thus requires, a plurality of a sub-field elements of a test video field and/or a plurality of sub-frame elements of a test video frame. With respect to (B), MPEP 2111 states “During patent examination, the pending claims must be ‘given their broadest reasonable interpretation consistent with the specification (emphasis added)”, and in the present case, the specification repeatedly and unambiguously describes a plurality of sub-frame elements as constituent parts of a test video frame. The allegation that “affecting a sub-field/frame element” can be interpreted as “affecting a sub-field **or frame element**” is thus

erroneous. Instead (and as discussed in more detail below), the proper interpretation of “sub-field/frame elements” can only be interpreted as sub-field elements and/or a sub-frame elements.

(A) **The Office Action’s alleged interpretation regarding frame element is completely inconsistent with the other explicit words of the claims and context thereof.**

Claim 1 requires: “sub-field/frame elements of a test video field/frame.” In view of a proper interpretation, this claim language could be re-written as follows: “sub-field elements and/or sub-frame elements of a test video field/frame.” Hence, claim requires sub-field elements of a test video field and/or sub-frame elements of a test video frame or, more simply, sub-elements of a test video field and/or of a test video frame.

The Office Action’s erroneous interpretation would have the following result: “sub-field elements and/or frame elements of a test video field/frame”, which could be re-written as follows: “sub-field elements of a test video field and/or frame elements of a test video frame”. The meaning of “sub-field elements of a test video field” is clear *prima facie*: the sub-field elements are constituent parts of the test video field. They are not the size of the field but will be smaller – this must be the case as a plurality of the sub-field elements belong to a single test video field.

Regarding the latter alleged interpretation of the Office Action, the question then arises: what meaning should be attached to the phrase “frame elements of a test video frame”? No answer would appear to be available, unless the following logic is adopted to interpret “sub-field elements”, i.e. to conclude that the frame elements are constituent parts of the test video frame. This result is mandated and supported by the other claim wording. Both the sub-field elements and the frame elements are said to be “of a test field/frame.” If “of a” is interpreted to mean “constituent parts of” when referring to the sub-field elements, then

normal rules of interpretation requires the same phrase to be interpreted in exactly the same way when applied to the frame elements.

As with the sub-field elements, this interpretation of “of a” requires that the frame elements are not the size of the frame but are smaller – as a plurality of the frame elements belong to a single test video frame. Following this line of reasoning, no significant difference can be ascertained between sub-field elements and the sub-frame elements (i.e. whether the “sub” is suppressed or not).

Moreover, claim 1 also requires:

“positioning, by execution of the computer system, in the matched reference video fields/frame at least one of the matching sub-field/frame elements to compensate for misalignment between at least one of the sub-field/frame elements of the test video field/frame and the at least one matching sub-field/frame elements.”

Hence, claim 1 includes the requirement that the sub-field/frame element be positioned in the matched reference field/frame to compensate for misalignment. The misalignment lies between sub-field/frame elements. This requirement of claim 1 is incompatible with interpreting “sub-field/frame element” to include an entire frame. How can a frame be positioned in a frame to compensate for misalignment?

Based of the explicit wording of the other claim language as well as the context provided by the other claim language, the proper interpretation of “sub-field/frame elements” as claimed is sub-field elements and/or a sub-frame elements.

(B) The Office Action’s alleged interpretation regarding frame element is completely inconsistent with the specification.

As noted above, “[d]uring patent examination, the pending claims must be ‘given their broadest reasonable interpretation consistent with the specification (emphasis added)”

Phillips v. AWH Corp., 415 F.3d 1303, 1316, 75 USPQ2d 1321, 1329 (Fed. Cir. 2005). Page

3, lines 1-5 (reproduced below with emphasis added) of the original specification reveals that the sub-field/frame elements are smaller than the corresponding field/frames:

“the invention provides for misalignments down to a sub-field/frame level to be handled by individually matching sub-field/frame elements of a test video field/frame with sub-field/frame elements from a reference video field/frame. The use of a matching element size that is significantly smaller than the video field/frame size enables transient sub-field/frame misalignments to be effectively tracked.”

Figure 4 (reproduced below) is a diagram illustrating the matching of sub-elements in an embodiment of the present invention (page 6, lines 14-15). Figure 5 (reproduced below) is a flow diagram illustrating the steps performed in order to match the sub-field/frame elements in the embodiment of the present invention (page 6, lines 16-17). As illustrated in Figure 4, the sub-field/frame elements correspond to pixel block B – i.e. a sub-element of the field/frame which is smaller than the frame. This is described at page 13, lines 13-14 of the original specification as “wherein the present field/frame is split into bx by by pixel blocks (emphasis added).” That is, pixel block B is smaller than the field/frame to which it belongs. See also , for example, step S. 5.6 of Fig. 5.

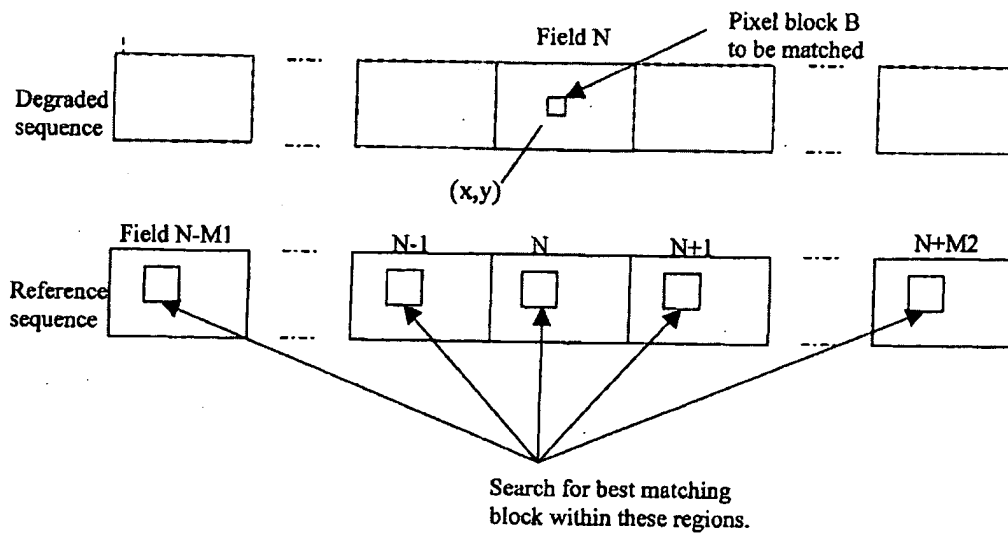
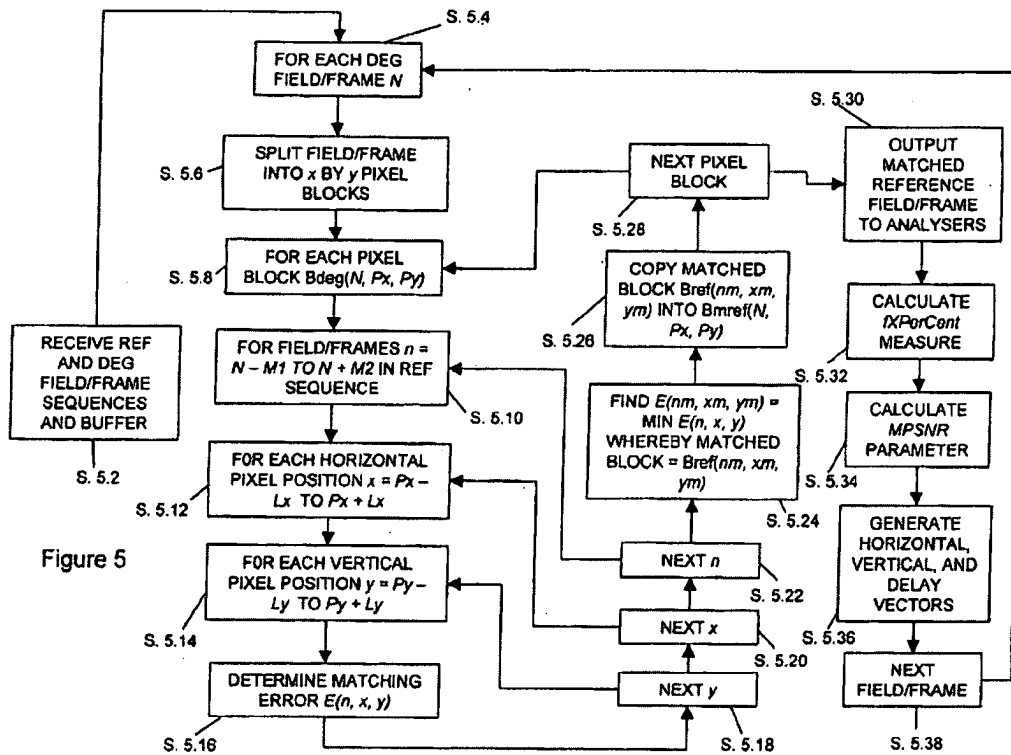


Figure 4



The interpretation of “sub-field/frame elements of a test video field/frame” as equating to: “sub-field elements and/or sub-frame elements of a test video field/frame” is also necessary in order to align the claims with the purpose and remit of the example embodiments of the invention, as set out in the original specification. For example, page 2, lines 25-27 of the original specification identifies the following problem:

“more complex, but equally imperceptible, misalignments may also occur within a field or frame, where different regions of a video field or frame might be subject to different shifts, scaling, or delay.”

Hence the problem addressed by the example embodiments of the present invention is concerned with sub-elements of a field or frame which are smaller than the field of frame.

At page 2, line 33 to page 3, line 5 of the original specification, the above problem set out at page 2, lines 25-27 is addressed, as follows:

“[t]he present invention addresses the above identified problem by providing a method and system for automated video quality assessment which reduces the adverse effects of sub-field/frame misalignments between the reference and

test sequences. More particularly, the invention provides for misalignments down to a sub-field/frame level to be handled by individually matching sub-field/frame elements of a test video field/frame with sub-field/frame elements from a reference video field/frame. The use of a matching element size that is significantly smaller than the video field/frame size enables transient sub-field/frame misalignments to be effectively tracked (emphasis added)."

Accordingly, the only interpretation of the claim element "sub-field/frame elements of a test video field/frame" which is supported by and consistent with the specification, which is consistent with the other claim language and makes sense in the context of the other claim language; and which addresses the identified problem, as set out in the above statement regarding the present invention, is the interpretation used consistently by the Applicant throughout the prosecution: "sub-field elements and/or sub-frame elements" of a test video field/frame. The Office Action's alleged interpretation is therefore erroneous.

For the reasons discussed in Applicant's Response filed August 9, 2010 (now incorporated herein by reference) as well as in view of the comments above regarding the proper interpretation of "sub-field/frame elements of a test video field/frame" as claimed, Applicant submits that Hu fails to disclose all of the claim limitations.

Unlike the prior art, the invention of claim 1 (for example) divides the test array into a plurality of sub-field/frame elements and searches in the reference signal for a "best match" for each sub-field/frame element (i.e., each part of the field/frame). The "best match" sub-field/frame elements are searched for in the reference fields/frames at various offsets to the position of the corresponding sub-field/frame element of the test fields/frames and/or across several adjacent fields/frames. Once selected each "best match" block is copied into the new, matched reference field/frame and shifted, as necessary, into a position matching the position of the corresponding test sub-field/frame.

In this way, the invention of claim 1 provides compensation for the complex misalignments that may occur within a field or frame, where different sub-elements (or pixel blocks) of a video field or frame might be subject to different shifts, scaling, or delay. These misalignments within a field or frame (i.e. affecting a sub-element or pixel block) are not addressed by Hu or the other cited references (e.g., Wolf, Kuhn) that have been cited.

The invention of claim 1 provides significant benefits over the teaching of the cited documents, as it enables more effective identification of visually insignificant imperfections in a video signal. By identifying imperfections imperceptible to the human viewer (such as the misaligned image sub-elements), the invention of claim 1 enables automatic video quality detection to exclude these effects and provide a quality score better aligned with the experience of a human viewer.

Applicant therefore requests that the rejection under 35 U.S.C. §102 be withdrawn.

Claims 7-10, 26-29 and 41-44 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Hu in view of Wolf et al. (U.S. '492, hereinafter "Wolf"). Claims 11-16, 30-35 and 45-50 have been rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Hu, Wolf and further in view of Kuhn (U.S. '083). Applicant traverses these rejections. For at least the reasons discussed in Applicant's Response filed August 9, 2010 (now incorporated herein by reference), Applicant requests that these rejections under 35 U.S.C. §103 be withdrawn.

Conclusion:

Applicant believes that this entire application is in condition for allowance and respectfully requests a notice to this effect. If the Examiner has any questions or believes that an

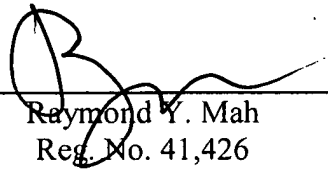
BOURRET, et al.
U.S. Application No. 10/560,448

interview would further prosecution of this application, the Examiner is invited to telephone the undersigned.

Respectfully submitted,

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By: _____


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